

December 13, 2000
Project 170-1



AIR SCIENCES INC.

Ms. Dolly Potter
Environmental Department
Solvay Minerals
P.O. Box 1167
Green River, WY 82935

Re: NO_x BACT Review for Coal-Fired Calciners and Kilns

Dear Dolly:

Air Sciences Inc. has completed the review of NO_x controls previously required on calciners and kilns in the U.S. This review is provided in anticipation of the possible fuel switching of calciners Nos. 17 (two original kilns), 48, and 80 from natural gas to coal (and ideally with the option of firing by either fuel). Our analysis carries through the established EPA BACT selection process to the step of listing the feasible technologies, which are "careful combustion control" and "low-NO_x combustors." We have not carried the BACT analysis further because Solvay has the option of proposing either or both of these as BACT for the fuel switching, or arguing that neither is necessary. A more quantitative BACT analysis is difficult because there is no established control efficiency associated with either of these control methods.

We would anticipate that the Wyoming BAQ (Bernie Dailey and Dennis Hemmer) would agree with this BACT analysis. However, depending on the net change in NO_x emissions from the current calciner potential to emit (PTE), there may be disagreement from the Federal Land Managers and EPA.* If NO_x emissions increase significantly from the present PTE, the Federal Land Managers may argue that fuel type can be considered part of the BACT analysis, and they may require a demonstration that the savings in fuel costs (going to coal from natural gas) must be greater than the per-ton NO_x control cost threshold for BACT.

Data from your 1995 switch from coal to natural gas on Stack 17 indicates a ten-fold decrease in NO_x. This implies that the switch back to coal would increase NO_x. However, the U.S. EPA concludes that the switch from natural gas to coal for cement

* The BACT review process as defined in "New Source Review Workshop Manual, Draft," Chapter B, October 1990 (BACT Guideline) states that "historically, EPA has not considered the BACT requirement as a means to redefine the design of the source when considering available control alternatives. However, this is an aspect of the PSD permitting process in which states have the discretion to engage in a broader analysis if they so desire." This phrase could provide an opening for the Federal Land Managers and EPA to argue that fuel switching (a design criterion) should be considered in the cost analysis for emissions control.

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AIR SCIENCES INC.

kilns generally results in lower NO_x emissions (see attached page from Chapter 11.6 of AP-42). From discussions with a particular cement company that has made this fuel switch, we have learned that the switch from natural gas to coal resulted in a decrease in NO_x emissions. Perhaps Solvay Minerals will find that the current technology coal combustion systems will have the same NO_x emissions result for them.

The BACT analysis is attached. If you have any questions, please call at your convenience.

Sincerely,

Air Sciences Inc.

Rodger G. Steen
Principal

RGS:srh

Attachments

R:\projects_100+\170 - Solvay\01 - BACT for Fuel Switch\BACT results to Solvay.doc

SOLVAY2016_1.3_000145

**NITROGEN OXIDES BACT ANALYSIS
SOLVAY MINERALS
GREEN RIVER FACILITY
DECEMBER 13, 2000**

BY
AIR SCIENCES INC.

THE BACT REVIEW PROCESS

The BACT analysis is performed in accordance with guidance provided in the U.S. EPA document *"New Source Review Workshop Manual, Draft,"* Chapter B, October 1990 (BACT Guideline). The Major Source BACT review process requires determination of BACT on a case-by-case basis with consideration of the unique aspects of each source and is conducted in the following five-step, top-down process:

- Identify all possible control technologies.
- Eliminate technologically infeasible technologies.
- Rank remaining control technologies by control effectiveness.
- Evaluate the most effective control technology.
- Select BACT.

In this analysis, the third and fourth steps are eliminated as there is no established control efficiency related to the feasible control methods, and a quantitative cost analysis is not possible.

Step 1: Identify all possible NO_x combustion control technologies.

The Solvay calcining process is addressed in the U.S. EPA Emissions Manual AP-42, Chapter 8.12. Under the "Emissions and Controls" section EPA states:

"Emissions of products of combustion, such as carbon monoxide, nitrogen oxides, sulfur dioxide and carbon dioxide occur from direct-fired process heating units such as ore calcining kilns and soda ash dryers. With the exception of carbon dioxide, which is suspected of contributing to global climate change, insufficient data are available to quantify these emissions with a reasonable level of confidence, but similar processes are addressed in various sections of Chapter 11 of AP-42, Mineral Products Industry."

There is no discussion of available control technology for the Trona industry in this chapter. The Portland Cement (Chapter 11.6), Lime Manufacturing (Chapter 11.17), Diatomite (Chapter 11.22), and Perlite (Chapter 11.30) sections of AP-42 were reviewed for NO_x emission controls on other types of kilns and calciners, and there was no information presented in any of these either regarding NO_x emission controls.

Reverting to general knowledge regarding the creation of NO_x in combustion processes, it is generally considered to be from the process of nitrogen fixation at high temperature in the presence of oxygen and to be a function of the amount of nitrogen bound in the fuel. General combustion NO_x control technology and methods include:

- modification of process to minimize NO_x formation (process design),
- control of combustion process to minimize NO_x formation (operational practice), and
- conversion of NO_x downstream of formation (add-on device, including SNCR and SCR).

Step 2: Eliminate technologically infeasible technologies.

Whether or not there are true NO_x emission controls for kilns by process design is speculative (Air Pollution Engineering Manual, AWMA, 1992). Regarding cement kilns, the reference states:

"A mechanism for the control of NO_x emissions from cement kilns has not been established, although several possibilities exist."

From this summary and the silence of EPA regarding a method of NO_x control, it appears that any control by process design would be only a very recent development. There appears to be no industry consensus on the ability to provide NO_x control by process design.

The EPA's RACT/BACT/LAER Clearinghouse (RBLC) and two California control databases (Air Resources Board BACT Clearinghouse and the Bay Area AQMD BACT Guideline) were searched on December 5, 2000, for NO_x controls presently in use in the U.S. There are 48 entries in the RBLC for BACT determinations, no LAER determinations, and 5 RACT determinations. The California ARB contributed two entries. Table 1 summarizes the types of controls listed in the Clearinghouse BACT for kiln and calcining processes.

TABLE 1
INSTALLED NO_x CONTROL TECHNOLOGIES AS LISTED IN THE CLEARINGHOUSE

Control Technology	Number of Cases in the Clearinghouse
No control	15
Careful combustion control	18
Low-NO _x combustors	9
Urea spray into preheater combustion zone – SNCR	2
Conversion to add a pre-calciner	3
Steam injection, alkaline stream in venturi scrubber	1
Kiln afterburner	1
Wet scrubbers	2
Baghouse	2

The two California determinations, which are not included in Table 1, were both for cement plants, and both employed pre-calciners and good combustion practices.

The baghouse entries (Clearinghouse Nos. MT-12 and GA-0031) were lime kilns, and the facilities used baghouses for particulate control. There was no BACT review for NO_x, so the entries are deemed to be incorrect. In both wet scrubber entries (Clearinghouse Nos. MO-35 and UT-57) there was a NO_x control review, but with no required equipment modifications or add-ons for NO_x control. The wet scrubbers were for particulate control, and these two cases are re-categorized as "careful combustion control." "Steam injection into burner" (Clearinghouse No. MI-197) was for a waste incinerator, and steam injection into a Trona process is not feasible because of the need for a dry product. The kiln afterburner (Clearinghouse No. CA-594) is a volatile organic control at a soil remediation kiln and is ruled out as a NO_x control. The baghouse, scrubber, steam injection, and afterburner control methods are eliminated from consideration as a NO_x control.

The preheater kilns at lime and cement facilities are principally for the purpose of heat recovery from the kiln exhaust and raise the thermal efficiency of the facility. Use of preheaters is a control practice at least to the extent that kiln temperatures can be decreased, and less fuel is consumed per unit of product because it is a more thermally efficient process. To the extent that heat can be recovered from calciner exhaust on the Solvay calciners, the practice is already incorporated with any resulting NO_x control. Thus preheaters are eliminated from consideration as a NO_x control for Solvay.

There are two entries of urea injection which is a form of selective non-catalytic reduction (SNCR) control technology. The first is for a waste heat boiler following a rotary kiln (RBLC No. CA-628) and the second for a kiln preheater (RBLC No NV-32). In both cases, the injection is into combustion flue gases above 1,600°F (NALCO FuelTech, NO_xOUT process). In these applications, the injection location is after the kiln and before the heat recovery unit. In the case of the Solvay calciners, the exhaust gases are about 350°F, well below the level needed for reaction, so the desired reaction of urea with NO_x would not take place. Thus SNCR technology is infeasible for the Solvay calciners.

The remaining control methods that may be feasible include:

- careful combustion control
- low-NO_x burners

Step 5: Selection of BACT for the Solvay calciners.

(At this point in the BACT analysis Solvay can either propose these as BACT for the re-firing modification, or present an analysis of the relative value of each and perhaps determine that either or both are not useful nor are BACT. Both methods are presumed to have some positive control effect, but there are no generally accepted control efficiencies for either of these control methods.)

11.6 Portland Cement Manufacturing

11.6.1 Process Description¹⁻⁷

Portland cement is a fine powder, gray or white in color, that consists of a mixture of hydraulic cement materials comprising primarily calcium silicates, aluminates and aluminoferrites. More than 30 raw materials are known to be used in the manufacture of portland cement, and these materials can be divided into four distinct categories: calcareous, siliceous, argillaceous, and ferri-frous. These materials are chemically combined through pyroprocessing and subjected to subsequent mechanical processing operations to form gray and white portland cement. Gray portland cement is used for structural applications and is the more common type of cement produced. White portland cement has lower iron and manganese contents than gray portland cement and is used primarily for decorative purposes. Portland cement manufacturing plants are part of hydraulic cement manufacturing, which also includes natural, masonry, and pozzolanic cement. The six-digit Source Classification Code (SCC) for portland cement plants with wet process kilns is 3-05-006, and the six-digit SCC for plants with dry process kilns is 3-05-007.

Portland cement accounts for 95 percent of the hydraulic cement production in the United States. The balance of domestic cement production is primarily masonry cement. Both of these materials are produced in portland cement manufacturing plants. A diagram of the process, which encompasses production of both portland and masonry cement, is shown in Figure 11.6-1. As shown in the figure, the process can be divided into the following primary components: raw materials acquisition and handling, kiln feed preparation, pyroprocessing, and finished cement grinding. Each of these process components is described briefly below. The primary focus of this discussion is on pyroprocessing operations, which constitute the core of a portland cement plant.

The initial production step in portland cement manufacturing is raw materials acquisition. Calcium, the element of highest concentration in portland cement, is obtained from a variety of calcareous raw materials, including limestone, chalk, marl, sea shells, aragonite, and an impure limestone known as "natural cement rock". Typically, these raw materials are obtained from open-face quarries, but underground mines or dredging operations are also used. Raw materials vary from facility to facility. Some quarries produce relatively pure limestone that requires the use of additional raw materials to provide the correct chemical blend in the raw mix. In other quarries, all or part of the noncalcareous constituents are found naturally in the limestone. Occasionally, pockets of pyrite, which can significantly increase emissions of sulfur dioxide (SO_2), are found in deposits of limestone, clays, and shales used as raw materials for portland cement. Because a large fraction (approximately one third) of the mass of this primary material is lost as carbon dioxide (CO_2) in the kiln, portland cement plants are located close to a calcareous raw material source whenever possible. Other elements included in the raw mix are silicon, aluminum, and iron. These materials are obtained from ores and minerals such as sand, shale, clay, and iron ore. Again, these materials are most commonly from open-pit quarries or mines, but they may be dredged or excavated from underwater deposits.

Either gypsum or natural anhydrite, both of which are forms of calcium sulfate, is introduced to the process during the finish grinding operations described below. These materials, also excavated from quarries or mines, are generally purchased from an external source, rather than obtained directly from a captive operation by the cement plant. The portland cement manufacturing industry is relying increasingly on replacing virgin materials with waste materials or byproducts from other manufacturing

facilities burn waste fuels, particularly spent solvents in the kiln, these systems also may emit small quantities of additional hazardous organic pollutants. Also, raw material feeds and fuels typically contain trace amounts of heavy metals that may be emitted as a particulate or vapor.

Sources of PM at cement plants include (1) quarrying and crushing, (2) raw material storage, (3) grinding and blending (in the dry process only), (4) clinker production, (5) finish grinding, and (6) packaging and loading. The largest emission source of PM within cement plants is the pyroprocessing system that includes the kiln and clinker cooler exhaust stacks. Often, dust from the kiln is collected and recycled into the kiln, thereby producing clinker from the dust. However, if the alkali content of the raw materials is too high, some or all of the dust is discarded or leached before being returned to the kiln. In many instances, the maximum allowable cement alkali content of 0.6 percent (calculated as sodium oxide) restricts the amount of dust that can be recycled. Bypass systems sometimes have a separate exhaust stack. Additional sources of PM are raw material storage piles, conveyors, storage silos, and unloading facilities. Emissions from portland cement plants constructed or modified after August 17, 1971 are regulated to limit PM emissions from portland cement kilns to 0.15 kg/Mg (0.30 lb/ton) of feed (dry basis), and to limit PM emissions from clinker coolers to 0.050 kg/Mg (0.10 lb/ton) of feed (dry basis).

Oxides of nitrogen are generated during fuel combustion by oxidation of chemically-bound nitrogen in the fuel and by thermal fixation of nitrogen in the combustion air. As flame temperature increases, the amount of thermally generated NO_x increases. The amount of NO_x generated from fuel increases with the quantity of nitrogen in the fuel. In the cement manufacturing process, NO_x is generated in both the burning zone of the kiln and the burning zone of a precalcining vessel. Fuel use affects the quantity and type of NO_x generated. For example, in the kiln, natural gas combustion with a high flame temperature and low fuel nitrogen generates a larger quantity of NO_x than does oil or coal, which have higher fuel nitrogen but which burn with lower flame temperatures. The opposite may be true in a precalciner. Types of fuels used vary across the industry. Historically, some combination of coal, oil, and natural gas was used, but over the last 15 years, most plants have switched to coal, which generates less NO_x than does oil or gas. However, in recent years a number of plants have switched to systems that burn a combination of coal and waste fuel. The effect of waste fuel use on NO_x emissions is not clearly established.

Sulfur dioxide may be generated both from the sulfur compounds in the raw materials and from sulfur in the fuel. The sulfur content of both raw materials and fuels varies from plant to plant and with geographic location. However, the alkaline nature of the cement provides for direct absorption of SO_2 into the product, thereby mitigating the quantity of SO_2 emissions in the exhaust stream. Depending on the process and the source of the sulfur, SO_2 absorption ranges from about 70 percent to more than 95 percent.

The CO_2 emissions from portland cement manufacturing are generated by two mechanisms. As with most high-temperature, energy-intensive industrial processes, combusting fuels to generate process energy releases substantial quantities of CO_2 . Substantial quantities of CO_2 also are generated through calcining of limestone or other calcareous material. This calcining process thermally decomposes CaCO_3 to CaO and CO_2 . Typically, portland cement contains the equivalent of about 63.5 percent CaO . Consequently, about 1.135 units of CaCO_3 are required to produce 1 unit of cement, and the amount of CO_2 released in the calcining process is about 500 kilograms (kg) per Mg of portland cement produced (1,000 pounds [lb] per ton of cement). Total CO_2 emissions from the pyroprocess depend on energy consumption and generally fall in the range of 0.85 to 1.35 Mg of CO_2 per Mg of clinker.

BACT Clearinghouse Database Lookup Results

3 Match(s) for Code 33

Calciners

Project Name & Description	A/C Issue Date & ARB File No.	Pollutant
Celite Corporation Diatomaceous earth calciner (Detailed Information)	12/5/97 (A/C no. 9757) A430-814-97 District Contact: Donna Lewis Santa Barbara County APCD (805) 961-8877	SOx (Detailed Control Information) Gas absorption tower (aka. scrubber). Packed-bed counter-current design using caustic as the solvent. 98% mass removal efficiency -----
National Cement Company (Kiln modernization project) 340 MMBtu/hr kiln with pre-calciner for cement manufacturing process (Detailed Information)	9/5/95 (A/C no. 1128004L) A390-638-95 District Contact: William Lund Kern County APCD (805) 861-2593 kcapcd@co.kern.ca.us	NOx (Detailed Control Information) Pre-calciner addition to modified (shortened) kiln lowering temperating and residence time inside kiln 3.4 lbm/ton of clinker 375 lbm/hr -----
Performance Information		
Lone Star Industries Suspension preheater with precalciner and rotary kiln (Detailed Information)	7/29/86 (A/C no. 723-1) A390-145-86 District Contact: Fred Thoits Monterey Bay Unified APCD (408) 443-1135	NOx (Detailed Control Information) Oxygen control on combustion air to precalciner 250 lbm/hr ----- SOx (Detailed Control Information) Alkaline slurry injection system 250 lbm/hr -----

[Click here to return the CAPCOA BACT Search Page](#)

12/16
CO₂ = CO₂ + CO₂
40.03
100 = 56 + 44

NO_x BACT/LAER Determinations
Sources: Kilns, Calciners, Dryers
Data Downloaded 12/5/00

RBLC ID	Facility	Process	Throughput	Controlled	Emissions	Control Code*	Control Description	Percent Efficiency	Basis
AL-0046	DRAVO LIME CO.	KILN, LIME, #4	800 T/D	94 LB/H	100 PMV AT 10% O ₂	P	KILN OPERATION	0	BACT-PSD
AL-0047	ALABAMA RIVER PULP CO.	KILN, LIME, #2	465 T/D CAO	100 PMV AT 10% O ₂	N			0	BACT-PSD
AL-0050	CHENEY LIME & GEMENT CO.	KILN, LIME	25 T/H		2.8 LB/T OF LIME	P	GOOD COMBUSTION PRACTICES	0	BACT-PSD
AL-0053	JAMES RIVER PENNINGTON	KILN, LIME #3	500 T CAO/D		175 PMV AT 10% O ₂	P	COMBUSTION CONTROLS	0	BACT-PSD
AL-0082	CHEMICAL LIME CO. OF AL. INC. - O'NEAL QU	LIME MANUFACTURING	113 TPH STONE FEED		1.5 LB/TON LIME PRODUCED	P	PROPER KILN DESIGN AND OPERATION	0	BACT-PSD
AL-0102	DRAVO LIME COMPANY-LONGVIEW DIVISION	CHEMICAL LIME MANUFACTURING	113 TONS PER HOUR		3.1 LB/TON OF LIME PROD.	B	PROPER KILN DESIGN AND OPERATION	0	BACT-PSD
AR-0028	ARKANSAS LIME COMPANY	KILN, LIME	625 T/D LIME		91.2 LB/H	P	PROPER DESIGN AND OPERATION OF LIME KILN	0	BACT-PSD
CA-0034	FERTECH ENVIRO SYSTEMS, INC.	SOIL REMEDIATION DRYER/KILN/AFTERBURNER	0		0.12 LB/MMBTU	A	KILN BURNER/AFTERBURNER (SEE NOTES)	0	BACT-OTHER
FL-0049	TARMAC FLORIDA, INC.	KILN, 1 EACH	162.5 MMBTU/H		0.7 LB/MMBTU	N	NOT REQUIRED UNDER BACT	0	BACT-PSD
FL-0058	GEORGIA-PACIFIC CORPORATION	KILN, LIME	0		290 PMVD AT 10% O ₂	P	COMBUSTION CONTROL	0	BACT-PSD
FL-0071	FLORIDA MINING & MATERIALS	KILN #2, CEMENT	79.59 TPH		250 LB/H 30 DAY AVE	P	GOOD COMBUSTION	0	BACT-PSD
FL-0087	CHAMPION INTERNATIONAL CORP	LIME KILN	0		200 PPM	P	GOOD COMBUSTION	0	BACT-PSD
FL-0111	BUCKEYE FLORIDA, L.P.	LIME KILN IN A KRAFT PULP MILL	750 TONS PER DAY LIME		68.44 LB/HR	P	GOOD COMBUSTION/BURNER MODIFICATIONS	0	BACT-PSD
GA-0031	ENGELHARD CORPORATION	DRYER, SPRAY AND CALCINER	20 T/H		1.83 LB/H SEE NOTE 3	B	HEAT RECOVERY FOLLOWED BY EXHAUST TO BAGHOUSE (SEE NOTES)	0	BACT-PSD
GA-0064	RIVERWOOD INTERNATIONAL CORPORATION	KILNS, 1 AND 2	8.4 TONS CAO/HR PER KILN		3.5 LBS NOX/TON CAO	P	LOW NOX BURNERS	0	BACT-PSD
IL-0052	MISSISSIPPI LIME COMPANY	KILN, ROTARY, LIME	2600 T/D		0.56 LB/T OF STEEL	P	LIME CALCINATION PROCESS	0	BACT-PSD
IL-0057	ILLINOIS CEMENT COMPANY	KILN, CEMENT, PREHEATER-PRECALCINER	0		4.5 LB/T CLINKER	P	CONVERSION TO PRECALCINER KILN	0	BACT-PSD
KY-0062	NEW RIVER LIME, INC.	KILN, ROTARY LIME (4)	46 TON/HR		96 LBS/HR	P	LOW NOX BURNERS	0	BACT-PSD
KY-0064	DRAVO LIME COMPANY - KY ROUTE 10	KILN, ROTARY LIME (2)	46 TONS/HR		90.292 LBS/HR	P	REDUCE NOX FROM COMBUSTION WITH NEW ROTARY KILN AND CALCINER - PREHEATER KILNS (PROCESS EQUIPMENT)	0	BACT-PSD
KY-0065	DRAVO LIME COMPANY - KY ROUTE 8	KILN, ROTARY LIME (3)	46 TONS/HR		128.33 LBS/HR	P	NOX REDUCTION FROM COMBUSTION - STANDARD COMBUSTION PROCESS	0	BACT-PSD
LA-0074	WILLAMETTE INDUSTRIES INC	KILN, LIME	1740 T ADP; 430 TDP C20		51.5 LB/H	P	DESIGN & OPERATION	0	BACT-PSD
MI-0197	DOW CHEMICAL COMPANY	INCINERATOR, ROTARY KILN	60 MMBTU/H		400 PMV AT 7% O ₂ 6H AV	B	HIGH-INTENS MIXED BURNERS; STEAM INJ BURNER IN SCC, ALKALINE STREAM IN VENTURI SCRUBBER	0	BACT-PSD
MO-0035	MISSISSIPPI LIME CO.	CONSTRUCT & OPERATE TWO ROTARY LIME KILN SYSTEMS	394200 TPD FINISHED PRODUCT		591.3 TPD	A	TWO VENTURI-TYPE WET SCRUBBERS, SO PROBABLY CO ₂	0	BACT-PSD
MO-0038	CHEMICAL LIME CO	LIME MANUFACTURE PLANT	2700 TPD OF LIME		1 LB/TON OF FEED	A	PROPER KILN DESIGN & OPERATE, LOW EXCESS AIR WITH COMPUTERIZED CONTROLS.	0	BACT-PSD
MO-0048	LAFARGE CORPORATION	RAW MILL, PREHEATER/PRECALCINER KILN (EP 78)	1584071 TONS		1894.8 TON/YR	P	GOOD COMBUSTION PRACTICES	0	BACT-PSD
MS-0015	WEYERHAEUSER CO.	KILN, LIME	21 T/H		300 PMVD AT 3.6% O ₂	P	PROCESS CONTROLS	0	BACT-PSD
MS-0029	WEYERHAEUSER COMPANY	KRAFT PULP MILL, LIME KILN	504 TONS (CAO)/DAY		300 PMVD @ 3.6% O ₂	P	EFFECTIVE OPERATION OF THE KILN	0	BACT-PSD
MT-0006	CONTINENTAL LIME-INDIAN CREEK OPN	LIME KILNS	500 TPD CAO EACH		77.5 LBS/HR	N		0	BACT-PSD
MT-0012	CONTINENTAL LIME INC.	KILN-LIME, TWO	0		77.5 LB/H EACH	A	BAGHOUSES, 75000 ACFM AT 470F WITH APPROX. 17000 SQ.FT AND AN AIR-TO-CLOTH RATIO OF 4:4:1.	0	BACT-PSD
NC-0056	CAROLINA'S CEMENT COMPANY, L.P.	PREHEATER/CALCINER/KILN/CLINKER COOLER?	298 MM BTU/HR		548 LB/HR	P	COMBUSTION UNIT DESIGN	0	BACT-PSD
NV-0032	GREAT STAR CEMENT CORP./UNITED ROCK PRODUCTS CORP.	CEMENT KILN/CLINKER COOLER FACILITY	0		3.1 LB/TON CLINKER PROD.	B	SELECTIVE NON-CATALYTIC REDUCTION (SNCR) UREA INJECTION SYSTEM AT PREHEATER	50	BACT-PSD
SC-0045	WILLAMETTE INDUSTRIES - MARLBORO MILL	LIME KILN	450 TONS CAO/DAY		175 PPM	P	GOOD COMBUSTION CONTROL	0	BACT
UT-0041	ASHGROVE CEMENT COMPANY	KILN, 1 EACH	150 T/YR		336 LB/HR	N		0	BACT
UT-0042	USPCI	KILN, 2 EACH	22 T/YR		45.5 LB/HR	P	GOOD COMBUSTION PRACTICES	0	BACT
UT-0044	APTUS, INC.	KILN, 1 EACH	0		114 PPM @ 7% O ₂	N		0	BACT
UT-0045	USPCI	KILN, 2 EACH	22 TONS/YEAR		45.5 LB/HR	N		0	BACT
UT-0054	CONTINENTAL LIME INC. - CRICKET MTN. LIME PLANT	KILN, #4	1200 T/D, LIME 50 T/hr = 0.5		200 LB/H	N		0	BACT-PSD
UT-0055	CONTINENTAL LIME INC. - CRICKET MTN. LIME PLANT	KILN, #3	840 T/D, LIME		160 LB/H	N		0	BACT-PSD
UT-0056	CONTINENTAL LIME INC. - CRICKET MTN. LIME PLANT	KILN, #2	600 T/D, LIME 25 T/hr		120 LB/H	N		0	BACT-PSD
UT-0057	CONTINENTAL LIME INC. - CRICKET MTN. LIME PLANT	KILN, #1	600 T/D, LIME 25 T/hr		0 LB/H	A	SCRUBBER	85	BACT-PSD
VA-0196	TEXASGULF, INC.	#3 KILN DEFLUORINATION	21.1 TPH		53.6 LB/HR	N		0	BACT-OTHER
WA-0282	ARCO PETROLEUM PRODUCTS CO	CALCINER, COKE, MATERIAL HANDLING	482000 T/YR		373 T/YR	N		0	BACT-PSD
WI-0062	WESTERN LIME AND CEMENT CO.	KILN, LIME, P38, S18	350 T/D		40.8 LB/H	P	DESIGN <1.1% O ₂ AT KILN OUTLET	0	BACT-PSD
WI-0082	CLM CORP.	KILN, LIME (4)	36 TPH INPUT		56 LB/HR	P	COMBUSTION CONTROL	0	BACT-OTHER
WY-0034	SOLVAY SODA ASH JOINT VENTURE TRONA MINE/SODA ASH	CALCINER, NATURAL GAS FIRED TRONA	275 T/H TRONA ORE FEED		0.05 LB/MMBTU	P	BURNER DESIGNED FOR LOW NOX* PERFORMANCE*	0	BACT-PSD
WY-0036	OCI, WYOMING L.P.-OCI SODA ASH PLANT	CALCINER TRONA ORE, NATURAL GAS FIRED	213 T/H ORE FEED RATE		0.05 LB/MMBTU	P	LOW NOX* BURNER DESIGN 230 MMBTU/HR*	0	BACT-PSD
WY-0038	WOLD TRONA CO.	CALCINER & CALCINER BOILER, COMMON STACK 2 EA.	0		0.048 LB/MMBTU	P	MONOWALL FURNACE CONSTRUCTION LOW NOX BURNERS WITH FUEL STAGING, 15% EXCESS AIR FLUE GAS RECIRCULATION (FGRS 15%) ON CALCINER BOILER COMBUSTION UNIT DESIGN (WELL DESIGNED PROCESS BURNER OPERATED IN DESIGN RANGE)	0	BACT-PSD
WY-0044	MOUNTAIN CEMENT COMPANY-LARAMIE FACILITY	KILN, COAL FIRED	45.3 T/H COAL		208.8 LB/H (30 DAY ROLLING)	P		20	BACT-PSD

Coal 210,000 Btu/lb
Nide 5 mm Btu/ton throughput of limestone = 5 mm Btu = 8.9 mm Btu/ton line
100 56 5

RACT Determinations
Sources: Kilns, Calciners, Dryers
Data Downloaded 12/5/00

RBLC ID	Facility	Process	Throughput		Pollutant	Emissions		Control Code*	Control Description	Percent Efficiency	Basis
			MMBTU/HR				0 SEE CNTRL DESC				
CA-0628	ARCO (CQC KILN PILOT PROJECT)	WASTE HEAT BOILER OFF OF ROTARY KILN	130		OXIDES OF NITROGEN			P	UREA INJECTION USING NOX-OUT PROCESS BY NALCO FUELTECH	0	RACT
CA-0638	NATIONAL CEMENT COMPANY (KILN MODERNIZATION)	KILN WITH PRE-CALCINER FOR CEMENT MANUFACTURING	340		OXIDES OF NITROGEN	3.4	LB/TON CLINKER	P	KILNLOWERS TEMPERATURE AND RESIDENCE TIME INSIDE KILN THEREBY REDUCING NOX FORMATION	0	RACT
NH-0006	GROVETON PAPER BOARD, INC.	CHEMICAL RECOVERY KILN	16.5	GAL/MIN@50+-5% SOLID	NOX	0.85	LB/TON BLACK LIQ/SL	N	NONE	0	RACT
PA-0131	J.E. BAKER COMPANY	KILN #1, COAL/COKE DIRECT-FIRED FULLER ROTARY	336	TPD PRODUCT	NOX	34	LB/TON PRODUCT	N	ANNUAL TESTING REQUIRED	0	RACT
PA-0131	J.E. BAKER COMPANY	KILN #2, COAL/COKE DIRECT-FIRED KFS ROTARY	540	TPD PRODUCT	NOX	38	LB NOX/TON PRODUCT	N	ANNUAL TESTING REQUIRED	0	RACT